

Work Order ID 72810

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Monday, August 15, 2011 2:33:48 PM

Item ID: D6104-009

Accept



Setup Start



Revision ID:

Stop



Item Name: Round Billet, 17-4

Start Date: 8/15/2011 Start Qty: 10.00



Cust Item ID:

Required Date: 8/26/2011 Req'd Qty: 10.00



Customer:

Reference:

Approvals: Process Plan: CL Date: 11/08/15 Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D6104	Rev B								

100

0.00



PURCHASING

Purchasing

Memo

0.00

Purchasing

Issue P/O: 14689 ☐ a) Description: S.S round billet ☐ b) Ø5.25" x
4.100" long ☐ c) Tolerance on all dimensions are +0.030"/-0.000" ☐ d) Material:
17-4PH Stainless steel ☐ e) Material certification requiredCL 11/08/16 10

110

0.00



Receive & Inspect for Damage & Mat'l Certs

Packaging

Memo

0.00

Packaging

Ensure material certification is attached

Pup 28 10

120

0.00



QC6- Inspect dimensions to drawing

QC

Memo

0.00

Quality Control

Ensure Material certification comply to Dwg D6104

ant 11/08/2910

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 72810

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Monday, August 15, 2011 2:33:48 PM

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Accept



Setup Start



Revision ID:

Stop



Item Name: Round Billet, 17-4

Start Date: 8/15/2011 Start Qty: 10.00



Cust Item ID:

Required Date: 8/26/2011 Req'd Qty: 10.00



Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

130

Identify as per dwg & Stock Location: MAT47 0.00

over 11/08/29



Packaging

Memo

0.00

10

~~0~~

Packaging

140

QC21- Final Inspection - Work Order Release 0.00

11/8/29 [Signature]



QC

Memo

0.00

Quality Control

11/08/29

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

Monday, August 15, 2011 2:33:45 PM

Page 1

Work Order ID: 72810

Parent Item: D6104-009

Parent Item Name: Round Billet, 17-4





Start Date: 8/15/2011

Required Date: 8/26/2011

Start Qty: 10.00

Required Qty: 10.00

Comments: IPP A: ☐02.07.11☐New Issue KJ

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6104-009P  17-4 SS Roundbar 5.25"OD		Purchased	No			110	Each	0.0000	1 	10			

PC 4/8/29 (10)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

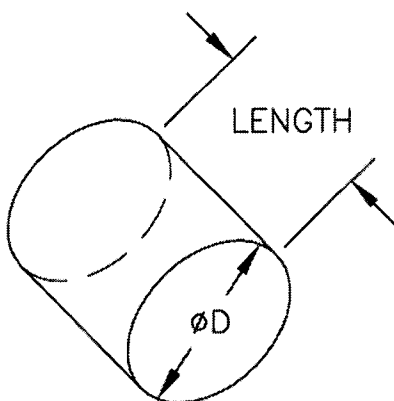


DESIGN <i>RT</i>	DRAWN BY <i>[Signature]</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D6104	Rev. B SHEET 1 OF 1
DATE 02.11.25		TITLE ROUND BILLET, 17-4 SCALE NTS	
A	01.04.10	NEW ISSUE	
B	02.11.25	CLARIFY ALLOY SPEC ADDED D6104-009/-011 REDUCE LENGTH OF BILLETS	

RELEASED

02.11.29 *[Signature]*

SPECIFICATION CONTROL DRAWING



C21108115
W10.72810

MATERIAL: 17-4 PH SS (AMS 5643 OR AISI 630) MIN UTS = 170 KSI (38 HRc)

PURCHASE MATERIAL ACCORDING TO THE FOLLOWING TABLE. SPECIFY ALLOY, DIAMETER x LENGTH (+0.030/-0.000) AS SHOWN.

TOLERANCE ON ALL DIMENSIONS IS +0.030/-0.000.

ALL DIMENSIONS ARE IN INCHES

Part No.	Alloy	D (Diameter)	Length
D6104-001	17-4 PH STAINLESS STEEL	Ø3.00	3.80
D6104-003	17-4 PH STAINLESS STEEL	Ø3.25	3.80
D6104-005	17-4 PH STAINLESS STEEL	Ø4.00	5.10
D6104-007	17-4 PH STAINLESS STEEL	Ø4.50	5.10
D6104-009	17-4 PH STAINLESS STEEL	Ø5.25	4.10
D6104-011	17-4 PH STAINLESS STEEL	Ø6.50	4.10

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**Castle Metals®**

A. M. Castle & Co.

PACKING SLIP

Page 1 of 1

Shipment No:950481

Ship From: A. M. Castle & Co. (Canada) Inc. MONTREAL 835-SELKIRK AVENUE POINTE CLAIRE, QUEBEC H9R 3S2		Sold To: DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CA		Ship To: DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CAN		Deliver To: DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CA	
Date Shipped 24-AUG-2011	F.O.B. ORIGIN	Freight Terms Prepaid		Carrier MANITOULIN		BOL No 950481-2	

Shipment Details	Final Destination Branch - MON
-------------------------	---------------------------------------

Order No	Line No	Item No	Description				
1651825	3	6004.MO	5.2500.RD.17CR-4NI.STAINLESS.RT.SOL TR.COND A.132.0000-156.0000 CUT TO 4.1 IN (+ .1250/- .0000 IN) - BAND SAW CUTTING SPECIFICATIONS: AISI 630,AMS 2303,AMS 5643,ASME SA564,ASTM A564,UNS S17400				
Purchase Order No		Part Number		Ordered Qty		Invoice Qty	
14689		YOUR ITEM NUMBER: D6104-009		10 PCS		10 PCS	
Details							
Delivery No.	Mill	Heat Number	Mech Id	PCS	Width (IN)	Length (IN)	Shipped Qty(LBS)
90711321		527171		10			258.84

These commodities/technologies are subject to US Export Administration & US State Dept. Regulations and, if intended for export, were/are exported thereunder. Diversion contrary to US Law is Prohibited.

We hereby certify the material covered by this certification conforms in accordance with the above specifications and has been found to meet the applicable requirements for the material, including any specifications forming a part of the description. Test reports are on file subject to examination. All claims for defective material are waived unless made in writing to A.M. Castle & Co. within 60 days of the shipment. Material cut to the correct size, or material cut by the customer cannot be returned for credit.

Reviewed by Authorized Castle Metals Representative:

Date:

TO: ALL WEIHS - OLE

- 527171

6004

14009

88004

6-1-11

Outokumpu

COMPLER

APPROVED

[Signature]



Certificate of Test

HEAT 527171 ORDER 619362/ 02 BOL 0212175 * CERTIFICATION * 05/25/11

SHIP TO:
A. M. CASTLE & CO.
26800 MILES ROAD
216-292-7600
BEDFORD HEIGHTS 441460000

----- YOUR ORDER & DATE -----
88004 5/25/11 CUST# 0254001 CUST TAG#6004

----- ITEM DESCRIPTION -----
GRADE 17-4 Ship Condition CONDA
Size 17-4 RND HRART CONDA 5.2500 x 144.000 RL
Country of Melt: SWEDEN Country of Mfg.: UNITED STATES
NAFTA Country of Origin is Country of Melt

No weld repair
Free of mercury contamination, Free of radiation contamination
No WEEE relevant substances; Meets EU electrical ROHS

Total Bundles 1 Total Weight 1875

WO 2016941 Bundles: 1E

----- SPECIFICATIONS -----
MFG TO FINISHED BAR IN THE USA FROM BILLETS IMPORTED SWEDEN
AMS 2303F AMS 5643R
UNS S17400, AISI 630 ASME SA564 E10
ASTM A484 11 ASTM A564 10 Type 630
DFARS 252.225.7014 6/05 AMC 3174-02 R31
Sol Ann 1900F/1Hr/Rapid Cool AISI 630, UNS S17400
Reduction Ratio 3:1 minimum
H900 capability sample aged at 900F/1hr/AC then tensile and HRC tested

----- MECHANICAL & OTHER TESTS -----
Hardness as shipped 294 HB Hardness as tested 400 HB
Hardness as shipped 031 HRC Hardness as tested (43 HRC)
Grain size 6.0 Tensile strength, KSI (MPa) 194.0 (1338)
Micro OK 0.2% Yield Strngth, KSI (MPa) 173.0 (1193)
Intergranular corrosion
Macro OK Elongation % in 4D 13.0
Reduction of area % 44.0
Ferrite .0

----- CHEMICAL COMPOSITION -----
Carbon (C) .010 Manganese (Mn) .710
Phosphorus (P) .025 Sulphur (S) .025
Silicon (Si) .360 Chromium (Cr) 15.320
Nickel (Ni) 4.680 Cobalt (Co) .036
Copper (Cu) 3.420 Moly (Mo) .170
Nitrogen (N) .021 Columbium (Cb) .230
Titanium (Ti) .005 Aluminum (Al) .003
Tin (Sn) .006 Cerium (Ce) .010
Boron (B) .001 Tantalum (Ta) .005
Vanadium (V) .036
Columbium/
Tantalum (Cb+Ta) .235
Iron (Fe) Balance
Frequency .000 Severity .000
Melt Practice EAF
Refining Practice AOD
De-long Ferrite

Knowingly & willfully falsifying or concealing a material act on this form, or making false, fictitious or fraudulent statements or representations herein could constitute a felony punishable under federal statutes. We hereby certify that the test results shown in this report are correct and accurate as contained in the records of the company and are in compliance with the specifications, codes, and standards listed above.

M.F. Marcanio, Quality Manager

CERTIFICAT D'ANALYSE DU MATERIEL
CERTIFICATE OF MATERIAL TEST REPORT



Castle Metals®

CLIENT:

DART AEROSPACE
1270 ABERDEEN
Hawkesbury, ON K6A 1K7 CA

MÉTAUX CASTLE CERTIFIE QUE LES INFORMATIONS
SUIVANTES SONT CONFORMES AUX CERTIFICATS
CHIMIQUE ET MÉTALLURGIQUE QUI NOUS ONT ÉTÉ
FOURNIS PAR NOS FOURNISSEURS ET GARDÉS EN
DOSSIER À NOTRE BUREAU.

CASTLE METALS CERTIFIES THAT THE FOLLOWING
INFORMATION IS TAKEN FROM CHEMICAL AND METAL-
LURGICAL TEST REPORTS FURNISHED TO US BY OUR
SUPPLIER AND WHICH ARE ON FILE IN OUR OFFICE.

NOUS CERTIFIONS QU'À NOTRE CONNAISSANCE, IL N'Y A
AUCUN MERCURE OU MATÉRIEL RADIOACTIF UTILISÉ
LORS DE LA COULÉE OU TRANSFORMATION DE L'ACIER
VENDU PAR NOTRE COMPAGNIE.

WE CERTIFY THAT WE HAVE NO KNOWLEDGE OF MERCURY
OR RADIOACTIVE MATERIAL USED IN THE MELTING OR
PROCESSING OF STEEL SOLD BY OUR COMPANY.

MANUFACTURER (FOULIN)/MANUFACTURER (MILL) OUTO KUMPU		NO. COMM. CLIENT/CUSTOMER ORDER NO. 14689		NO. REQUISITION CLIENT/CUSTOMER REQUISITION NO.	
IAC 6004	NO. COULÉE/HEAT NUMBER 527171	NO. COMM./ORDER NO. 1651828	LIGNE/LINE NO. 3	Q'TÉ EXPÉDIÉE/Q'TY SHIPPED 258.84 LBS	DATE LIVRÉE/SHIP. 24 Aout 11

5.2500.RD.17CR-4NI.STAINLESS.RT.SOL TR COND

AMS 5643 R

10 PCS X 4.1

A.M. CASTLE & CO. (CANADA) INC

Sophie Belanger